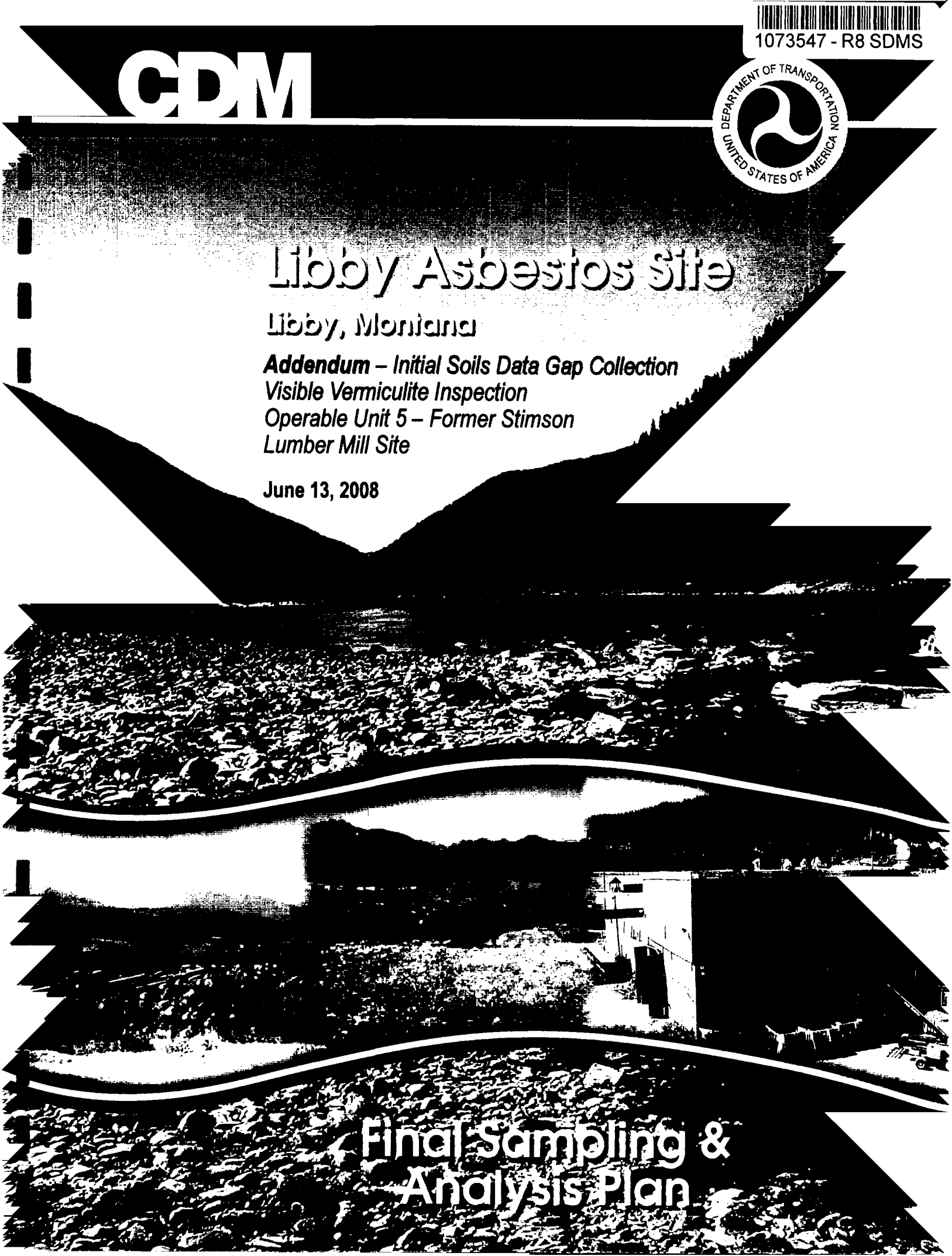
CDM

Libby Asbestos Site

Libby, Montana

***Addendum** – Initial Soils Data Gap Collection*
Visible Vermiculite Inspection
Operable Unit 5 – Former Stimson
Lumber Mill Site

June 13, 2008



Final Sampling & Analysis Plan

Final
Sampling and Analysis Plan
Addendum - Initial Soils Data Gap Sample Collection
Visual Vermiculite Inspection
Operable Unit 5 - Former Stimson Lumber Mill Site
Libby Asbestos Site
Libby, Montana

June 13, 2008

Contract No. DTRT57-05-D-30109
Task Order No. 00006

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Final
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Operable Unit 5 - Former Stimson Lumber Mill Site
Libby Asbestos Site
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Acronyms

ABS	activity based sampling
CDM	CDM Federal Programs Corporation
DSR	data summary report
DQOs	data quality objectives
EDD	electronic data deliverable
EDS	energy dispersive spectroscopy
EPA	U.S. Environmental Protection Agency
FSDS	field sample data sheet
GPS	global positioning system
IDW	investigation-derived waste
ISO	International Organization for Standardization
LA	Libby amphibole
OU	operable unit
PI	point inspection
PLM-VE	polarized light microscopy – visual estimation
QA	quality assurance
QC	quality control
s/cc	structures per centimeter squared
SAP	sampling and analysis plan
site	former Stimson Lumber Mill
SOP	standard operating procedure
SRC	Syracuse Research Corporation
SWQAPP	site wide quality assurance project plan
TEM	transmission electron microscopy
UCL	upper confidence limit
um	micrometer
USGS	United States Geological Survey
Volpe Center	John A. Volpe National Transportation Systems Center
QA	Quality Assurance
QC	Quality Check

Section 1
Introduction

This document describes the specific investigation activities required to conduct an additional soil data gap investigation within the Operable Unit 5 (OU5) – Former Stimson Lumber Mill, hereby referred to as the site. This document was prepared as a sampling and analysis plan (SAP) addendum to the *Final, SAP for Initial Soils Data Gap Sample Collection at the Stimson Lumber Mill Site, OU5, Libby, Montana*, dated September 10, 2007 (CDM Federal Programs [CDM] and Syracuse Research Corporation [SRC]), hereafter referred to as the OU5 Initial Soils Data Gap SAP (SRC and CDM 2007a).

This addendum contains updated data quality objectives (DQOs) that reflect changes from those required in the OU5 Initial Soils Data Gap SAP (SRC and CDM 2007a) relating to the additional investigation data needed to support decision-making.

The procedures detailed in this SAP addendum will be used to collect information regarding the presence of visible vermiculite in areas of the site not previously inspected for the presence of visible vermiculite using the current site protocol: standard operating procedure (SOP): Semi-Quantitative Visual Estimation for Vermiculite in Soils at Residential and Commercial Properties (CDM-LIBBY-06, Revision 1).

Unless otherwise noted in this addendum, all sample collection and laboratory requirements are the same as detailed in the OU5 Initial Soils Data Gap SAP (SRC and CDM 2007a).

1.1 Objectives

This section defines the objectives of this SAP addendum to the initial soils data gap sample collection for OU5 and the intended use of the data collected.

As determined by previous investigations conducted at the Libby Asbestos Superfund Site, Libby amphibole (LA) asbestos is present in multiple environmental media in Libby including: indoor air, outdoor ambient air, indoor dust, vermiculite insulation, and soils. As a result, residents of Libby may be exposed to LA, and these exposures may pose a risk of cancer and/or non-cancer effects.

The existing data set for OU5, presented in the *Final Data Summary Report* (DSR) *OU5 Libby Asbestos Site Libby, Montana* dated October 16, 2007 (CDM 2007a), indicated initial data gaps related to LA concentrations and visual vermiculite observations in soils at the site existed at the following locations:

- Libby Groundwater Superfund Site
- Former nursery waste bark piles and soil underneath

- Banks of Libby Creek
- Known areas of LA containing dust and/or soil
    - Former nursery shed
    - Former nursery activity-based sampling areas
    - Former guard station at Libby Creek
    - Diesel pump house
    - Soil sample location CS-09294

During the analysis of the results from the initial soils data gap analysis conducted in 2007, it was determined that an additional data gap needed to be filled. This gap was related to areas previously sampled only during screening level investigations conducted in 2002, as shown in Figure 1-1 are included in the amended investigation described in this SAP:

- Motocross Track
- Lumber Yard
- Southwest Area
- Railroad Spur
- Log Storage Area
- Former Popping Plant

These locations have had soil samples collected; however, a 5-point composite sample was collected at that time, instead of the current protocol using a 30-point composite sample. In addition, the visible inspection procedures during the screening level inspections were not as robust as current procedures.

In addition to the inspection for visual vermiculite and the collection of soil samples, opportunistic personal air samples will be collected to estimate potential exposures from the disturbance of soils in each of these areas.

The objective of the sampling program described in this SAP addendum is to collect data of sufficient representativeness and quality to evaluate the presence/absence of surficial vermiculite and LA asbestos content within the areas listed above.

1.2 Project Schedule and Deliverables

Sampling is anticipated to be conducted between June and July 2008. Once the data set is evaluated by the U.S. Environmental Protection Agency (EPA) risk assessment and management teams, additional data collection may be deemed necessary to support final decision-making specific to OU5.

Section 2
Site Background

The reader is referred to Section 2 of the OU5 Initial Soils Data Gap (SRC and CDM 2007a) for background information related to the site.

Section 3
Data Quality Objectives

The DQO process, based on scientific methods, is a series of planning steps that are designed to ensure that the type, quantity, and quality of environmental data used in decision-making are appropriate for the intended purpose. EPA has issued the guidelines, *Guidance on Systematic Planning Using the Data Quality Objective Process, QA/G4, dated February 2006 (EPA 2006)* to help data users develop site-specific DQOs These guidelines were followed for the development of the DQOs presented in this section.

The DQO process specifies project decisions, the data quality required to support those decisions, specific data types needed, data collection requirements, and analytical techniques necessary to generate the specified data quality. The process also ensures that the resources required to generate the data are justified. The DQO process consists of seven steps; output from each step influences the choices that will be made later in the process. These steps include:

1. State the problem
2. Identify the decision
3. Identify the inputs to the decision
4. Define the study boundaries
5. Develop a decision rule
6. Specify tolerable limits on decision errors
7. Optimize the design

3.1 Step 1 – State the Problem

The purpose of this step is to describe the problem to be studied so that the focus of the investigation will be unambiguous.

Humans may be exposed to LA by disturbing site soils at a number of different locations in OU5, including the following (see Figure 1-1):

- BMX Track - Located in the southeast corner of the OU5 site, within the south portion of the Log Storage Area
- Lumber Yard – Located along the northeastern boundary of the site
- Southwest Area – Located along the southwestern boundary of the site

- Railroad Spur – Located along the northwestern boundary of the site
- Log Storage Area - Located along the southeastern boundary of the site
- Former Popping Plant – Located north of City Hall and Montana Athletic Club

Historically, EPA has conducted site investigations to characterize the level of LA contamination within these areas; however, the current dataset does not provide enough detail to properly assess the nature and extent of contamination or the level of risk posed to humans who disturb the soil. Therefore, a more robust investigation to determine the presence of visible vermiculite using current site protocols is required. Opportunistic personal air samples will also be collected to estimate potential exposures to LA resulting from the disturbance of soils at the site.

3.2 Step 2 – Identify the Decision

This step identifies what questions the investigation will attempt to resolve and what actions may result.

The decision to be made is whether remedial action by EPA is needed to ensure protection of human health from exposure to LA released to air by disturbance of current surficial soils in OU5.

3.3 Step 3 – Identify the Inputs to the Decision

The purpose of this step is to identify the environmental data that need to be obtained and the measurements that need to be taken to resolve the decision statements.

Human health risk from LA in soil is related to the amount of LA released to air when the soil is disturbed, coupled with a consideration of the frequency that soil disturbances occur, and the duration over which they occur. Data from studies in OU4 indicate that LA is release to air from nearly all soils in Libby, and that airborne concentrations are likely to be above a level of concern for most exposure scenarios if even low levels of visible vermiculite are observable in the soil. Based on this, the key data needed to support risk assessment and risk management decisions are observations on the level of visible vermiculite in OU5, stratified into a number of decision units (exposure units).

In addition to visible vermiculite data, data on the level of LA as measured by polarized light microscopy – visual estimation (PLM-VE) may also be valuable. If a soil sample is positive by PLM-VE, it is also usually positive for visible vermiculite, thereby serving as a valuable confirmation of positive results. However, there are a number of cases where PLM-VE is negative, but visible vermiculite is detected. Thus, negative PLM-VE results are not viewed as definitive evidence of the lack of contamination. For these reasons, soil samples will be analyzed for PLM-VE analysis.

3.4 Step 4 – Define the Boundaries of the Study

This step specifies the spatial and temporal boundaries of this investigation.

3.4.1 Spatial Bounds

Visible vermiculite inspections will be performed within the boundary of OU5 as depicted in Figure 1-1. Soil sampling for this investigation will be limited to the collection of surface samples (0-6 inches). Previous sampling efforts and results are described in the Final Data Summary Report for OU5 (CDM 2007a). While isolated areas of subsurface contamination may exist, subsurface sampling has not proven to successfully identify localized areas of vermiculite and/or LA contamination and therefore will not be conducted at OU5.

3.4.2 Temporal Bounds

The level of LA and visible vermiculite in soil is not considered to depend on time, so there are no temporal constraints on the time that sampling occurs.

3.5 Step 5 – Develop Decision Rules

The purpose of this step is to describe the method that EPA will use to make final risk management decisions from the data.

Currently, the risk assessment for OU5 is still under development. It is expected that decisions will be based on the estimated level of cancer risk from inhalation exposure to LA released from site soils to breathing zone air. If the estimated risks exceed a level of concern to EPA, then EPA will investigate actions that may be taken to reduce or prevent exposures from soil disturbance.

3.6 Step 6 – Specify Tolerable Limits on Decision Errors

The tolerable limits on decision errors, used to establish performance goals for the data collection design, are specified in this step.

When risk management decisions are made, two types of decision errors are possible:

- A Type I (false negative) decision error would occur if a risk manager decides that soil does not contain LA above a level of concern, when in fact it is of concern.
- A Type II (false positive) decision error would occur if a risk manager decides that levels of LA in soil are above a level of concern, when in fact it is not.

EPA is most concerned about guarding against the occurrence of Type I errors, since an error of this type may leave humans exposed to unacceptable levels of LA in exposure pathways at OU5. In general, EPA seeks to avoid false negative decision errors by using the 95% upper confidence limit (UCL) of the mean exposure concentration to evaluate risks.

EPA is also concerned with the probability of making Type II (false positive) decision errors. Although this type of decision error does not result in unacceptable human

exposure, it may result in unnecessary expenditure of resources. Generally, EPA allows for a 20% false positive rate. This is usually achieved by collecting sufficient samples that the uncertainty around the mean concentration is relatively small.

3.7 Step 7 – Optimize the Design for Obtaining Data

This step identifies a resource-effective data collection design for generating data that are expected to satisfy the DQOs. The data collection design is described in detail in the remaining sections of this SAP addendum and other site documents referenced in Section 4.

Section 4
Sampling and Visual Inspection Program

This SAP addendum investigation will use the same process and procedures detailed in the OU5 Initial Soils Data Gap SAP (SRC and CDM 2007a) unless otherwise noted. This section describes the investigation effort that will be conducted to meet the objectives of this SAP. A summary of all sampling activities is also shown in Table 4-1.

4.1 Pre-Investigation Activities

Prior to beginning field activities, a field planning meeting will be conducted, any required trainings will be conducted, and an inventory of equipment and supplies will be performed to determine procurements needs. The reader is referred to the OU5 Initial Soils Data Gap SAP (SRC and CDM 2007a) for specifics regarding the pre-sampling activities.

4.2 Site Preparation

Prior to conducting the soil sampling activities described above, portions of the site may require bush-hogging and/or mowing to remove overgrown areas in order for the surface soils to be visible for the required inspections. During this activity, one personal air sample will be collected from the person performing the weed removal. This sample will be collected in accordance with the Response Action SAP (CDM 2008). This sample will be sent for analysis by International Organization for Standardization (ISO) transmission electron microscopy (TEM) method 10312.

Once the site has been made accessible, a global positioning system (GPS) unit will be used to setup an investigation grid, as shown in Figure 1-1. This grid will be used to establish a boundary for each visual inspection area and composite soil sample. Grid size at the site will vary depending on the location of the investigation. The BMX track will be setup on an approximate 100-foot by 100-foot grid. The Lumber Yard, Southwest Area, and Log Storage Area will be setup on a 500-foot by 500-foot grid. Due to the limited size of the Railroad Spur and the Former Popping Plant, each will be setup as a single investigation area.

Portions of the grid along the site or location boundaries may be less than the full grid size assigned to that area. Grid areas that are less than 500 x 500 feet (ft) may be combined together as long as they are adjacent to each other and are in the same land use area and less than or equal to a combined square footage of 250,000 square feet.

While every attempt will be made to inspect all areas, if sample grids are located within inaccessible areas (e.g., steep bank, lagoon areas, etc.), the field team will discuss these locations with the field team leader and health and safety team as appropriate and mark these areas on the appropriate sketches.

4.3 Visible Vermiculite Inspection

A visible vermiculite inspection will be conducted within each of the established investigation grids. A point inspection (PI) will be conducted along the surface of the soil and a semi-quantitative observation of vermiculite (none, low, medium, or high) will be made at each PI. There will be a total of 30 PIs within each grid, regardless of grid size.

Field forms and site maps will be used to document all quantitative observations made during the visual inspection. The field team leader for this investigation will ensure that all field work has been completed appropriately and that the semi-quantitative observations are consistent with the standards identified in the visual vermiculite inspection SOP CDM-LIBBY-06. This SOP is provided in Appendix B of the OU5 Initial Soils Data Gap SAP (SRC and CDM 2007a).

The visible vermiculite inspection will be completed in conjunction with the collection of soil samples.

4.4 Soil Sample Collection

Soil sample collection will be conducted within each of the established grids. The surface soil samples will be 30-point composite samples collected from 0 to 6 inches below ground surface. There will be a total of 30-points within each grid, regardless of grid size.

All soil sampling efforts will be conducted in accordance with the current version of CDM-LIBBY-05, as provided in Appendix B of the OU5 Initial Soils Data Gap SAP (SRC and CDM 2007a).

Soil moisture will be estimated for each sample by the hand appearance method that provides results in percent of field capacity. This is performed by firmly squeezing a handful of soil and comparing the results to the table below. For each sample used for this evaluation the soil should be collected from the center of the sample area and be from 0 to 2 inches below ground surface.

Field Test for Moisture Content – Interpretation Table			
% Soil Moisture Deficiency	Moderately coarse texture	Medium texture	Fine and very fine texture
0 (field capacity)	Upon squeezing, no free water appears on soil but wet outline of ball is left on hand.		
0 to 25	Forms weak ball, breaks easily when bounced in hand.*	Forms ball, very pliable, slicks readily.*	Easily ribbons out between thumb and forefinger.*

25 to 50	Will form ball, but falls apart when bounced in hand.*	Forms ball, slicks under pressure.*	Forms ball, will ribbon out between thumb and forefinger.*
50 to 75	Appears dry, will not form ball with pressure.*	Crumbly, holds together from pressure.*	Somewhat pliable, will ball under pressure.*
75 to 100	Dry, loose, flows through fingers.	Powdery, crumbles easily.	Hard, difficult to break into powder.
*Squeeze a handful of soil firmly to make ball test.			

In addition to estimating soil moisture content in the field, 10% of soil samples submitted for asbestos analysis will also be analyzed for moisture content using *American Society for Testing and Materials (ASTM) Method D2216-05: Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass.*

In addition, soil texture will be determined as prescribed by United States Department of Agriculture, Natural Resources Conservation Service techniques (see modification to ERT SOP #2084 in Final, Sampling and Analysis Plan for Activity-Based Outdoor Air Exposures, Operable Unit 4 (CDM 2007b)). The result will be recorded in the logbook.

4.5 Air Sample Collection

During the inspections and soil sampling one personal air sample will be collected from the person performing the activity. This sample will be collected in accordance with the Response Action SAP (CDM 2007a). This sample will be sent for analysis by ISO TEM method 10312. The air sample collection will be conducted within the same historic land use area established grids located on Figure 1-1.

For outdoor personal air, the target analytical sensitivity for outdoor ABS samples is 0.001 structures per cubic centimeter (s/cc). The target sensitivity is based on calculations and rationale provide in the Outdoor ABS SAP (SRC and CDM 2007b). However, these samples are opportunistic in nature and are intended to provide an understanding of the range of exposures associated with this activity.

4.6 General Processes

This section describes the general field processes that will be used to support the sampling described in this SAP addendum and includes references to the site wide Quality Assurance Project Plan Site Wide Quality Assurance Project Plan (SWQAPP) (CDM 2007b) and investigation-specific modifications to established project

procedures when applicable. These general field processes would include the following:

- Equipment Decontamination
- Sample Labeling and Identification
- Field Logbooks
- Field Sample Data Sheet (FSDS)
- Photographic Documentation
- Field Equipment Maintenance
- Handling investigation-derived waste (IDW)
- Field Sample Custody and Documentation
- Sample Packaging and Shipping
- Modification Documents
- Field Surveillance and Audits

The reader is referred to the OU5 Initial Soils Data Gap SAP (SRC and CDM 2007a) for specifics regarding the general field processes used to support sampling.

4.7 Quality Assurance /Quality Control (QA/QC) Activities

The QA/ QC actions required for each process described in this SAP addendum will follow the requirements described in the SWQAPP (CDM 2007b).

Table 4-2 summarizes the collection frequency for QA samples and indicates corrective actions that may be required based on their results.

Section 5
Laboratory Analysis and Requirements

The laboratories used for all sample analysis will have participated in, and acceptably analyzed, the required parameters in the last two proficiency examinations from the National Institute of Standards and Technology/National Voluntary Laboratory Accreditation Program. The laboratory must also analyze project specific performance evaluation samples or other reference materials when requested. These analyses must be performed before any samples are submitted to the laboratory to confirm the laboratory's capabilities and may be subsequently submitted at regular intervals. In addition, the laboratory must participate in the laboratory training program developed by the Libby laboratory team.

5.1 Analytical Methods

This section describes the analytical methods that will be used to analyze samples collected to support this SAP addendum.

All soil samples collected as part of this effort will be archived pending direction from EPA. If analysis is requested, the soil samples will be analyzed for asbestos by PLM-VE in accord with SOPs SRC-LIBBY-01, Revision 2 and SRC-LIBBY-03, Revision 2.

All air samples collected as part of this effort will be submitted to a subcontracted laboratory for analysis using the ISO TEM method 10312, also known as ISO 10312:1995(E) (CDM 2003), with all applicable project specific modifications, including LB-000016, LB-000019, LB-000028, LB-000029b, LB-000030, LB-000053, LB-000066c, and LB-00084 (CDM 2003b). All asbestos structures (including not only LA but all other asbestos types as well) that have appropriate diffraction patterns and energy dispersive spectroscopy (EDS) spectra, and having length greater than or equal to 0.5 micrometer (um) and an aspect ratio ≥ 3:1, will be recorded on the Libby site-specific laboratory data sheets and electronic deliverables.

5.2 Analytical Sensitivity

The target analytical sensitivity for all air samples is 0.001 s/cc. All air field blanks collected as part of this program will be analyzed by counting a number of grid openings that is approximately equal to the number of grid openings that are analyzed for field samples. It is expected that this will be about 30 grid openings. Rationale for this sensitivity is provided in Section 3 of the Outdoor ABS SAP (SRC and CDM 2007b).

5.3 Holding Times

No preservation requirements or holding times are established for soil samples collected for asbestos analysis.

5.4 Laboratory Custody Procedures and Documentation

Laboratory custody procedures and documentation will be completed as required by the specifications detailed in Section 4.5 of the SWQAPP (CDM 2007b).

5.5 Documentation and Records

Laboratory documentation and records will be completed as required by the specifications detailed in Section 4.7 of the SWQAPP (CDM 2007a).

5.6 Data Management

Sample results data will be delivered to the Department of Transportation, Research and Innovative Technology Administration, John A. Volpe nation Transportation Systems Center (Volpe Center) and CDM's Cambridge office both in hard copy and as an electronic data deliverable (EDD) in the most recent project-specific format. Electronic copies of all project deliverables, including graphics, will be filed by project number. Electronic files will be routinely backed up and archived according to individual laboratory processes.

All results, field data sheet information, and survey forms will be maintained in the Libby project database managed by the Volpe Center under the oversight of the Volpe Center database management team.

Section 6
Assessment and Oversight

Assessments and oversight reports to management are necessary to ensure that procedures are followed as required and that deviations from procedures are documented. These reports also serve to keep management current on field activities.

The reader is referred to Section 6 of the OU5 Initial Soils Data Gap SAP (SRC and CDM 2007a) for information related to assessment and oversight for this SAP Addendum.

Section 7
Data Validation and Usability

Laboratory results will be reviewed for compliance with project objectives. The reader is referred to Section 7 of the OU5 Initial Soils Data Gap SAP (SRC and CDM 2007a) for information related to data validation and usability for this SAP Addendum.

Section 8
References

CDM. 2007a. Final Data Summary Report, Operable Unit 5, Libby Asbestos Site, Libby, Montana. October 16.

____. 2007b. Site-Wide Quality Assurance Project Plan. Final date pending EPA review.

____. 2006. Guidance on Systematic Planning Using the Data Quality Objective Process, QA/G-4. February.

SRC and CDM. 2007a. Final, SAP for Initial Soils Data Gap Sample Collection at the Stimson Lumber Mill Site, OU5, Libby, Montana, September 10, 2007.

_____. 2007b. Final, Sampling and Analysis Plan for Activity-Based Outdoor Air Exposures, Operable Unit 4. Libby, MT Superfund Site. July 6.

TARGET SHEET

EPA REGION VIII

SUPERFUND DOCUMENT MANAGEMENT SYSTEM

DOCUMENT NUMBER: 1073547

SITE NAME: LIBBY ASBESTOS

DOCUMENT DATE: 06/13/2008

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DOCUMENT DESCRIPTION:

FIGURE 1-1 AMENDED SITE INVESTIGATION LOCATIONS AND GRID LAYOUT, STIMSON LUMBER COMPANY, OU5

Contact the Superfund Records Center to view available document.
(303) 312-6473

Table 4-1 Summary of Investigation Activities

Sampling Location	Approximate Grid Size	Soil Sampling		Visual Inspection
		No. of Composites	Depth (in)	No. of PIs
BMX Track	100 by 100 ft	30	0 to 6	30
Lumber Yard	500 by 500 ft	30	0 to 6	30
Southwest Area	500 by 500 ft	30	0 to 6	30
Railroad Spur	Size of Area	30	0 to 6	30
Log Storage Area	500 by 500 ft	30	0 to 6	30
Former Popping Plant	Size of Area	30	0 to 6	30

Notes:

1. All soil samples collected are to be archived.

PI = Point Inspections

Table 4-2 Summary of Field QC Samples by Media

Media	Sample Type	Minimum Collection Frequency	Minimum Analysis Frequency	Acceptance Criteria	Acceptance Criteria Failure Action
Air	Lot Blank	1 per 500 cassettes	100%	ND for all asbestos	Rejection of all cassettes in lot
	Field Blank	1 per day when air samples are collected	10% of total collected per week	ND for all asbestos fibers	Analysis of additional field blanks to determine source of potential cross-contamination, qualification of sample results, evaluation of field sample handling procedures
Soil	Field Duplicate	1 per 20 samples	100%	<30% RPD	Evaluation of sample collection techniques

Notes: QC - *quality control*; ND - *nondetect*; RPD - *relative percent difference*; COC - *chain of custody*